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Please cancel Claim 26.

β 2
27. (Amended) An apparatus as described in claim 29 wherein the controller means includes a dynamic model such that the controller means compensates for undesired motion of the base due to various motions of the wheels.

β 2
Cont
29. (Amended) A mobile base movable relative to a surface, the base comprising:

a main housing;

at least two wheels pivotably and rotatably mounted to the housing, each wheel having a steering axis and a rotation axis with the steering and rotation axes nonintersecting and offset by a known caster distance;

drive means for rotating the wheels to roll along the surface;

steering means for pivoting the wheels and changing their heading with respect to the surface; and

controller means for reading an input vector from a host processor, wherein the input vector is a three dimensional force torque vector,

reading the steering axis headings,

calculating a desired torque for each steering and rotation axis such that at any given time, the calculated resultant forces on the base reflect the input vector, regardless of the positions of the steering and rotation axes, and

commanding the calculated torque to each steering and rotation axis,

wherein the calculated torque of each steering and rotation axis is computed from the input vector and a generalized inverse of a constraint matrix, C, the constraint matrix being defined by the following kinematic relationship:

$$\bar{m}_a = C \bar{m}_x$$

where \bar{m}_a represents a motion axis vector and \bar{m}_x represents actual mobile base motion and wherein the generalized inverse of C is chosen such that a sum of squares of the axis torques is minimized.

30. (Amended) An apparatus as described in claim 29 wherein the generalized inverse of C is chosen such that a sum of squares of wheel contact forces is minimized.

31. (Amended) An apparatus as described in claim 29 wherein there is an instantaneous power for each of the steering and rotation axes and wherein the generalized inverse of C is chosen such that a sum of the instantaneous powers of all of the axes is minimized.
